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Medizinische Universität
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SCUOLA EUROPEA DI SCIENZE
DELLA SALUTE

AUTONOME
PROVINZ
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PROVINCIA
AUTONOMA
DI BOLZANO
ALTO ADIGE

TRATTAMENTO DELLE PATO- LOGIE VASCOLARI SOPRA- AORTICHE: NUOVE STRATEGIE

CONVEGNO INTERUNIVERSITARIO

C'È ANCORA INDICAZIONE ALLA CAS ?

Fare clic per modificare lo stile del sottotitolo dello schema

ANTONELLO M, MD PhD

**CHIRURGIA VASCOLARE ED
ENDOVASCOLARE**

DS TCV, Università di Padova, Dir: Prof. F. Grego

[www.chirurgiavascolarepadova.i](http://www.chirurgiavascolarepadova.it)

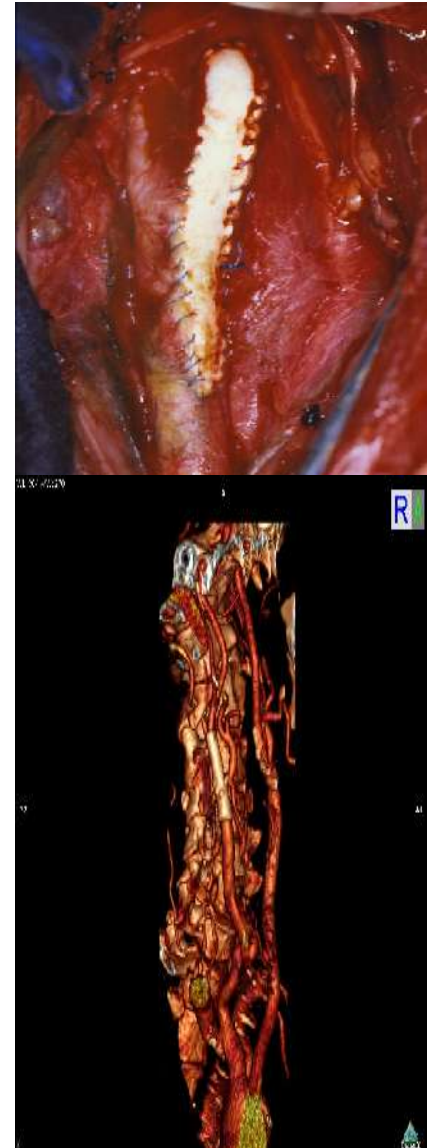
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BACKGROUND

- CAVATAS
- SAPHIRE
- EVA-3S
- SPACE
- CREST
- TACIT
- ACST-2

Percutaneous transluminal angioplasty and stenting for carotid artery stenosis (Review)

Ederle J, Featherstone RI, Brown MM



BACKGROUND

RISULTATI A MEDIO-LUNGO TERMINE

CREST: a 4 anni i pazienti con IM postoperatorio hanno una mortalità maggiore rispetto ai pazienti che non hanno avuto IM. I pazienti con minor stroke nel post-operatorio non hanno un rischio aumentato di morte.

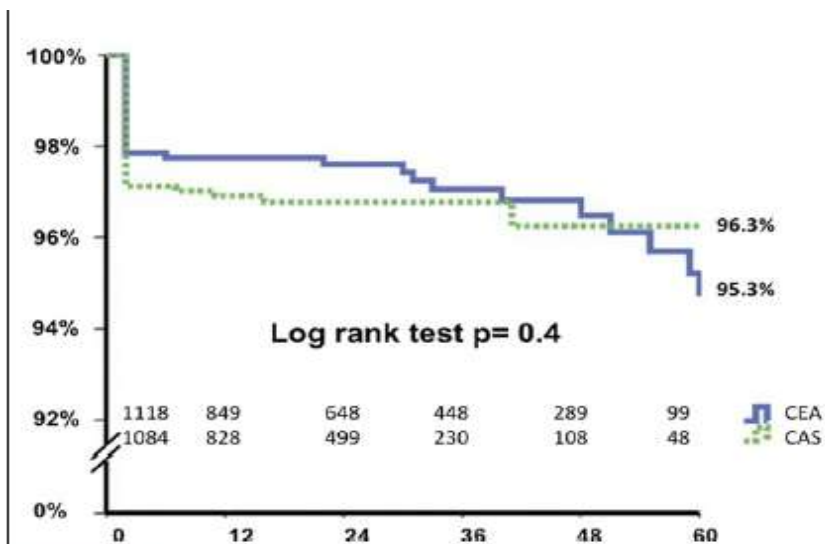


Figure 2

5-Year Kaplan-Meier Estimates of Freedom From Ipsilateral Stroke Plus Any Periprocedural Stroke or Death

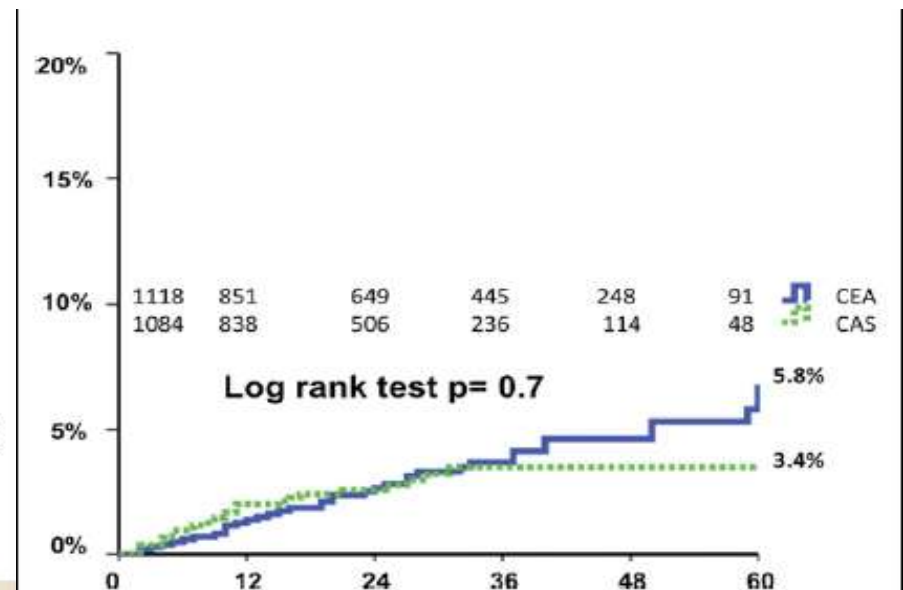


Figure 3

5-Year Probability of Restenosis After Procedure

HIGH RISK PATIENTS

Symptomatic carotid stenosis ($>50\%$)

Previous radiation

Difficult surgical access

Carotid lesion above C2/3, ie, angle of mandible to mastoid:

Blaisdell line

Structural/arthritis limitation causing inability to extend the neck beyond neutral

Prior radical neck dissection

Restenosis from prior carotid endarterectomy

Comorbidities

Ongoing unstable angina, defined as rest ECG changes (ST-T wave changes)

Respiratory deficiency (requires home oxygen, or $FEV_1 < 1\text{ L}$)

Recent myocardial infarction (with onset within 30 d)

Uncontrollable diabetes (ie, ketosis or inability to stabilize glucose $<400\text{ mg/dL}$)

Renal dialysis dependency

ECG, Electrocardiogram; *FEV₁*, forced expiratory volume in 1 second.

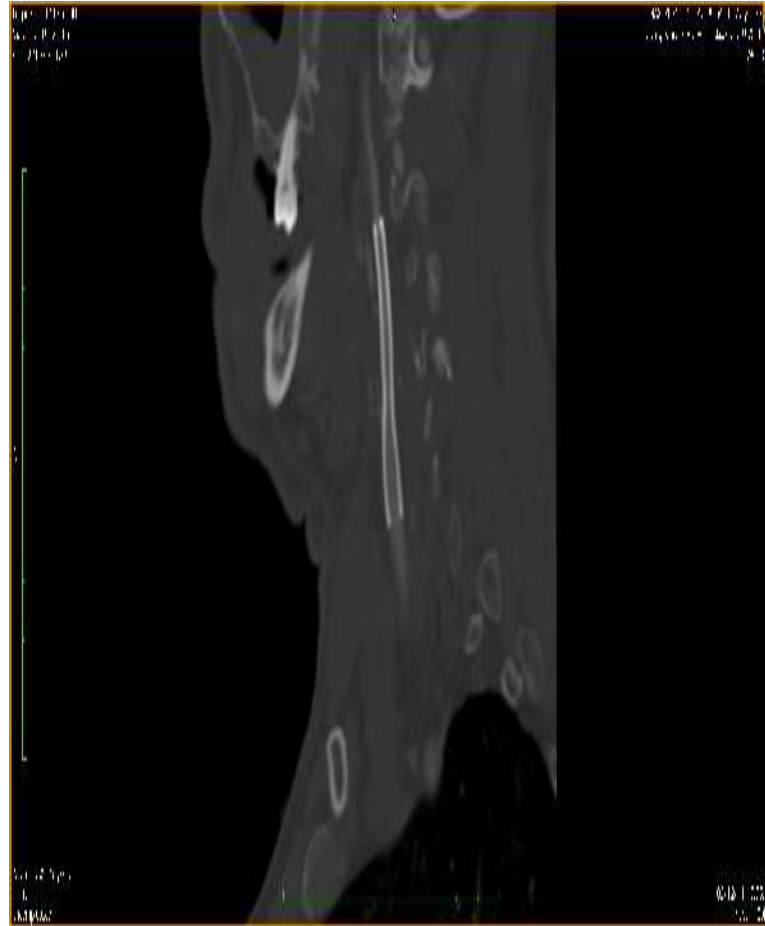
HIGH RISK PATIENTS

Protected carotid stenting in high-surgical-risk patients: The ARCHeR results

William A. Gray, MD,^a L. Nelson Hopkins, MD,^b Sanjay Yadav, MD,^c Thomas Davis, MD,^d Mark Wholey, MD,^e Richard Atkinson, MD,^f Alberto Cremonesi, MD,^g Ronald Fairman, MD,^h Gary Walker, PhD,ⁱ Patrick Verta, MD,ⁱ Jeff Popma, MD,^j Renu Virmani, MD,^k and David J. Cohen, MD, MSc,^l for the ARCHeR Trial Collaborators,* *New York and Buffalo, NY; Cleveland, Ohio; Detroit, Mich; Pittsburgh and Philadelphia, Penn; Sacramento, Calif; Ravenna, Italy; Boston, Mass; and Bethesda, Md* **J Vasc Surg 2006**

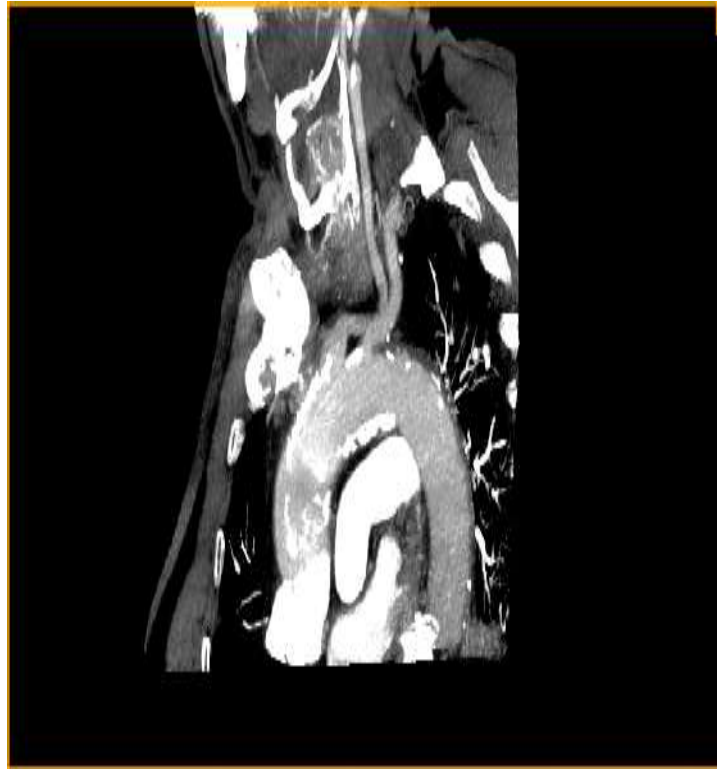
In conclusion, the results of the ARCHeR study demonstrate that extracranial carotid artery stenting with embolic filter protection is not inferior to the historical results of CEA among high-surgical-risk patients and suggest that carotid stenting is a safe and effective stroke-prevention alternative to endarterectomy for such patients. The extended application of this technology in other patient cohorts awaits further study.

Carotid Artery Stenting



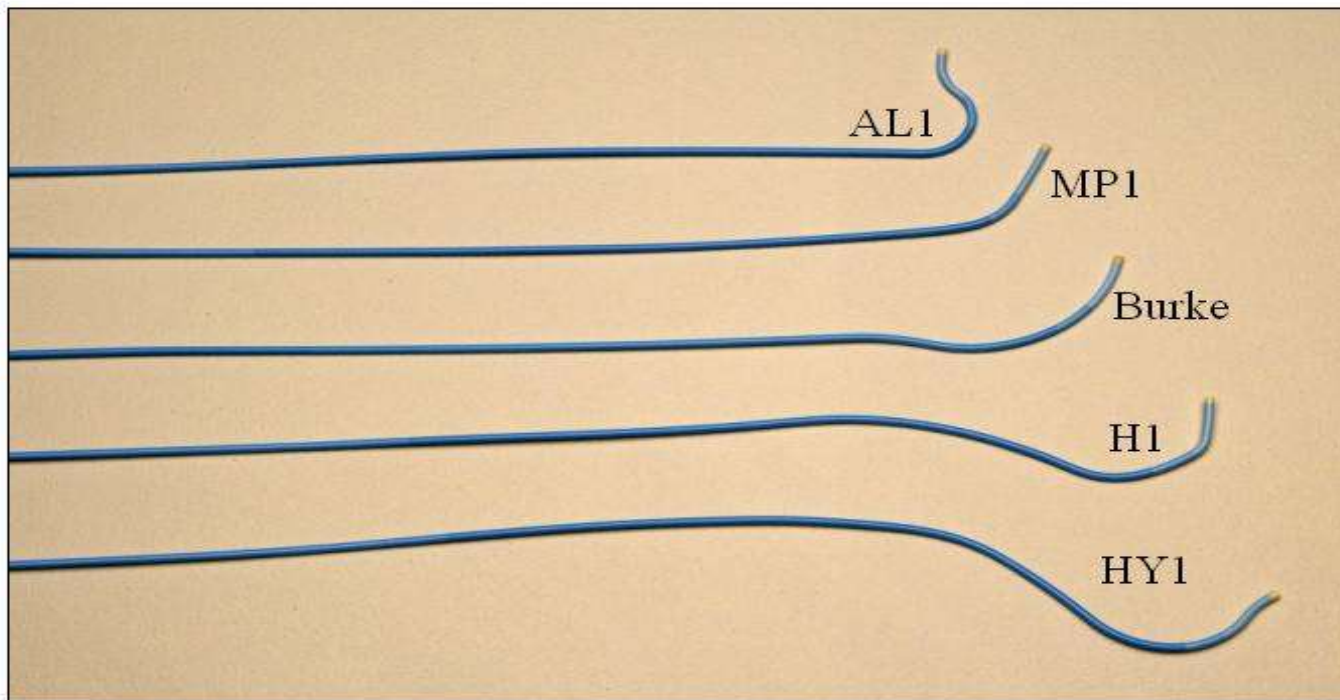
Carotid Artery Stenting

- Manipolazione Arco



CATETERI PORTANTI

Carotid Guide Catheters

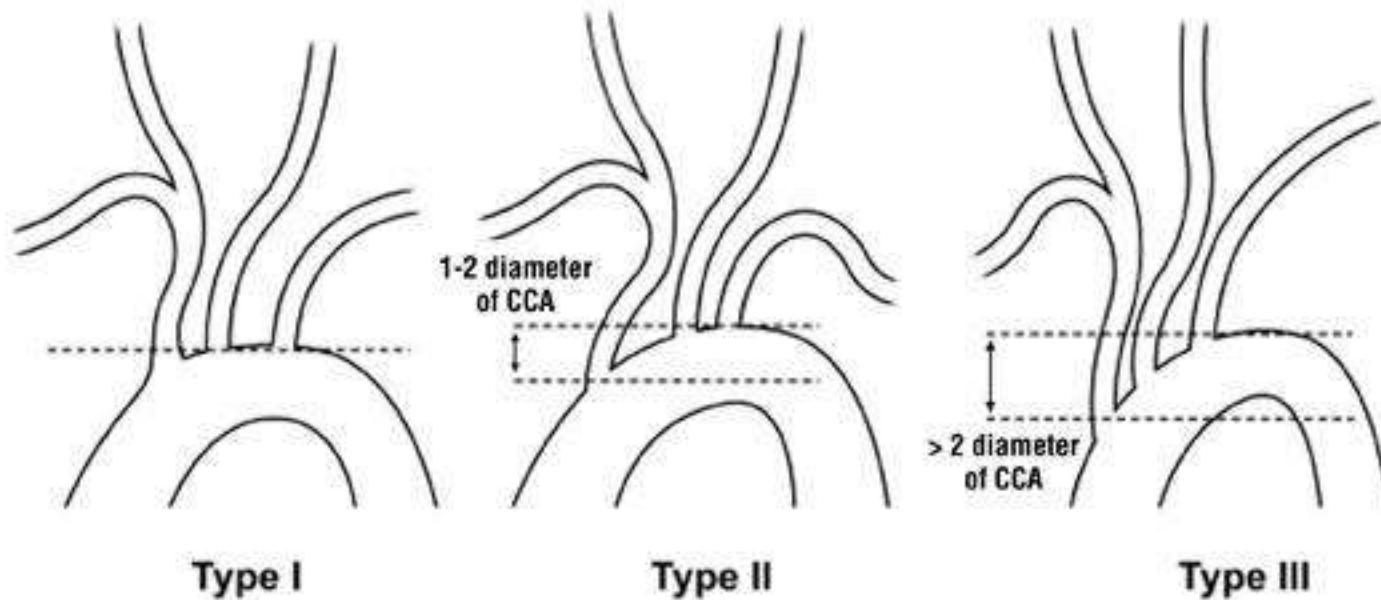


Cordis
a Johnson & Johnson company

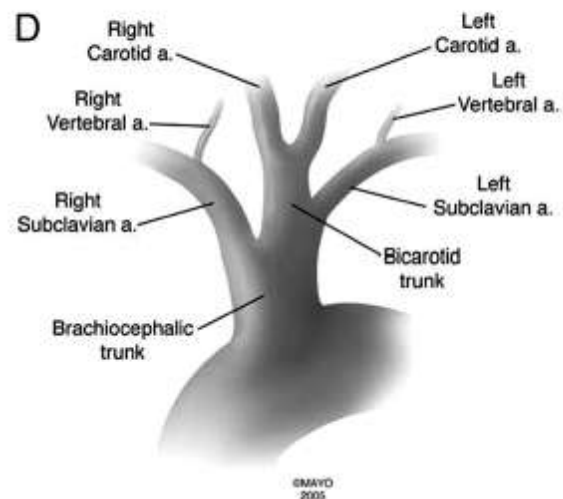
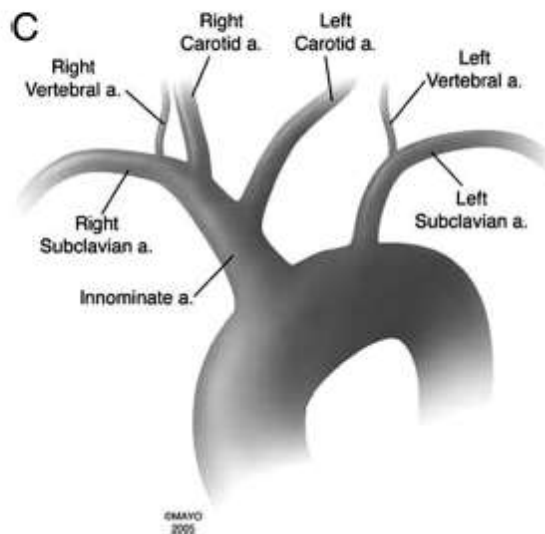
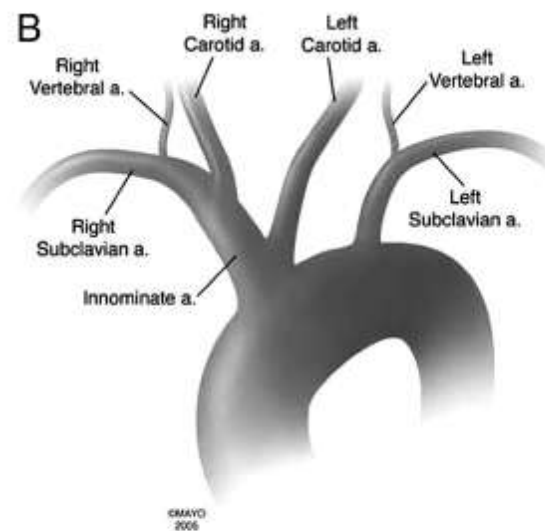
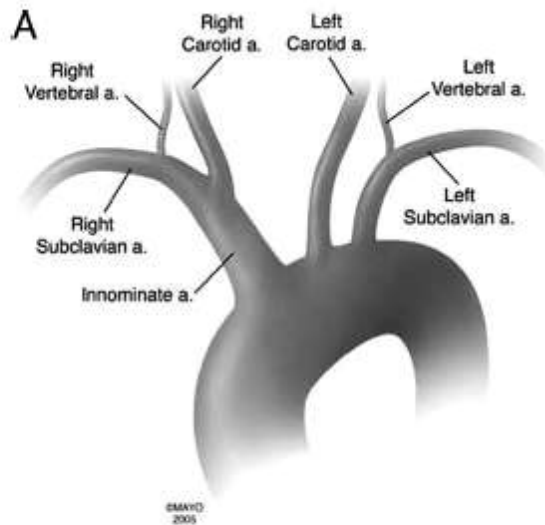
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ANATOMIA ARCO



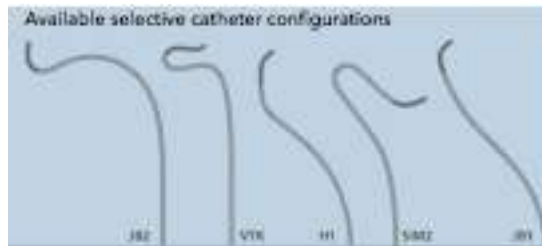
ANATOMIA ARCO



GUIDING SHEAT



Flexor[®]
TECHNOLOGY



Pinnacle[®] Destination[®]
GUIDING SHEATHS



Carotid Artery Stenting

- Manipolazione Arco
- Posizionamento Sistema di Protezione Cerebrale



SISTEMI DI PROTEZIONE CEREBRALE

Cerebral Protection Devices

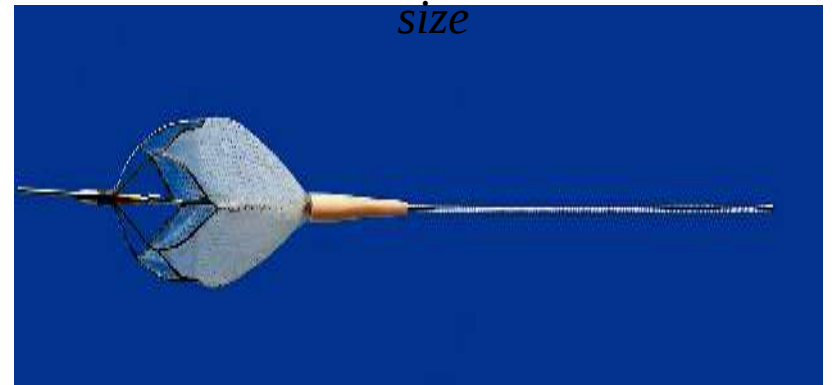


AngioGuard XP
100 μ pore size

Filter Wire EX
80-110 μ pore size

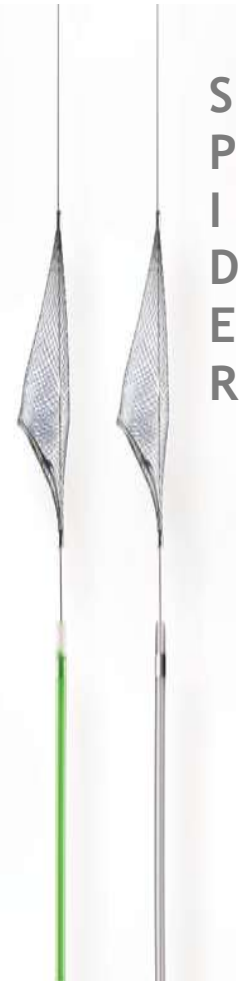


ACCUNET
 *$\leq 150 \mu$ pore
size*



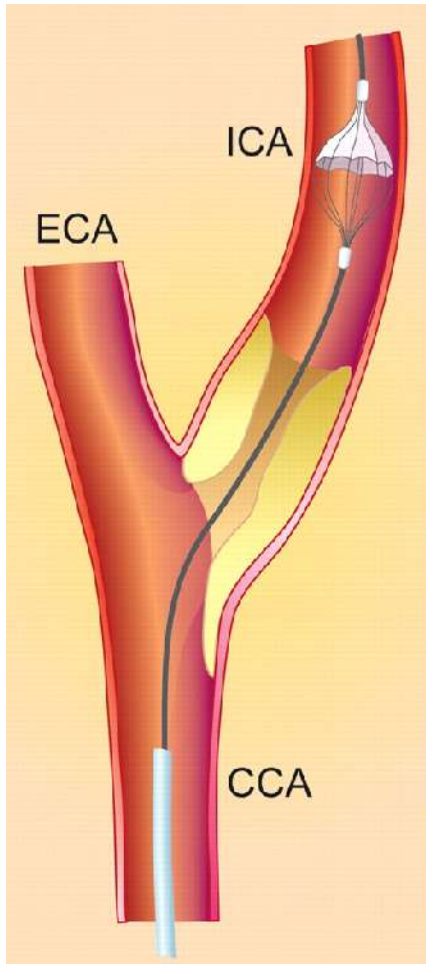
SISTEMI DI PROTEZIONE CEREBRALE

Cerebral Protection Devices

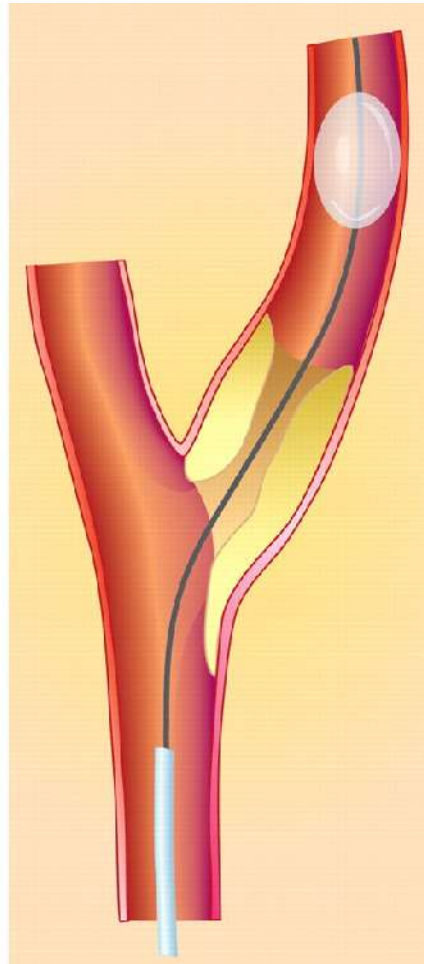


SISTEMI DI PROTEZIONE CEREBRALE

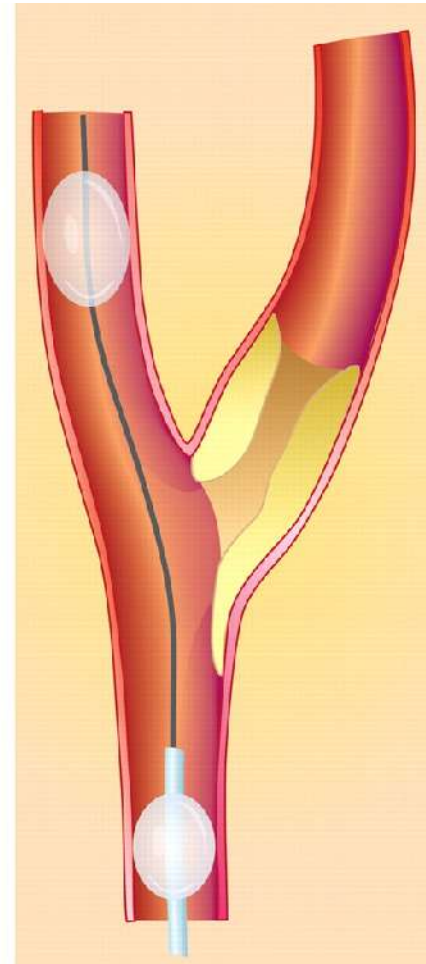
Cerebral Protection Devices



Filter



Distal occlusion

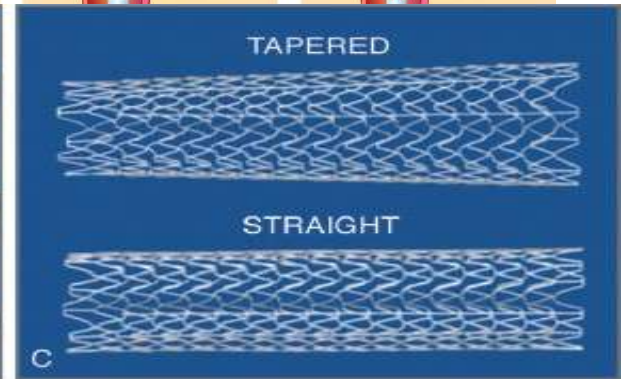
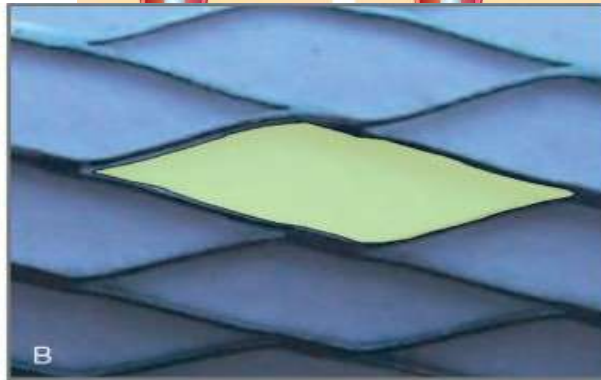
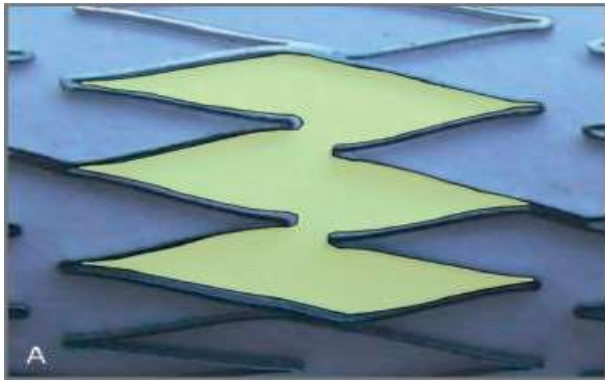
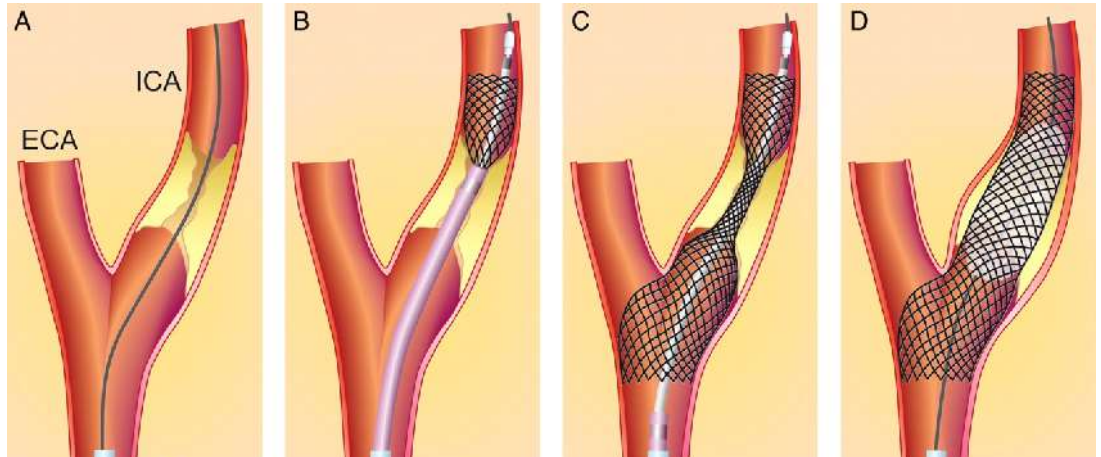


Proximal Occlusion



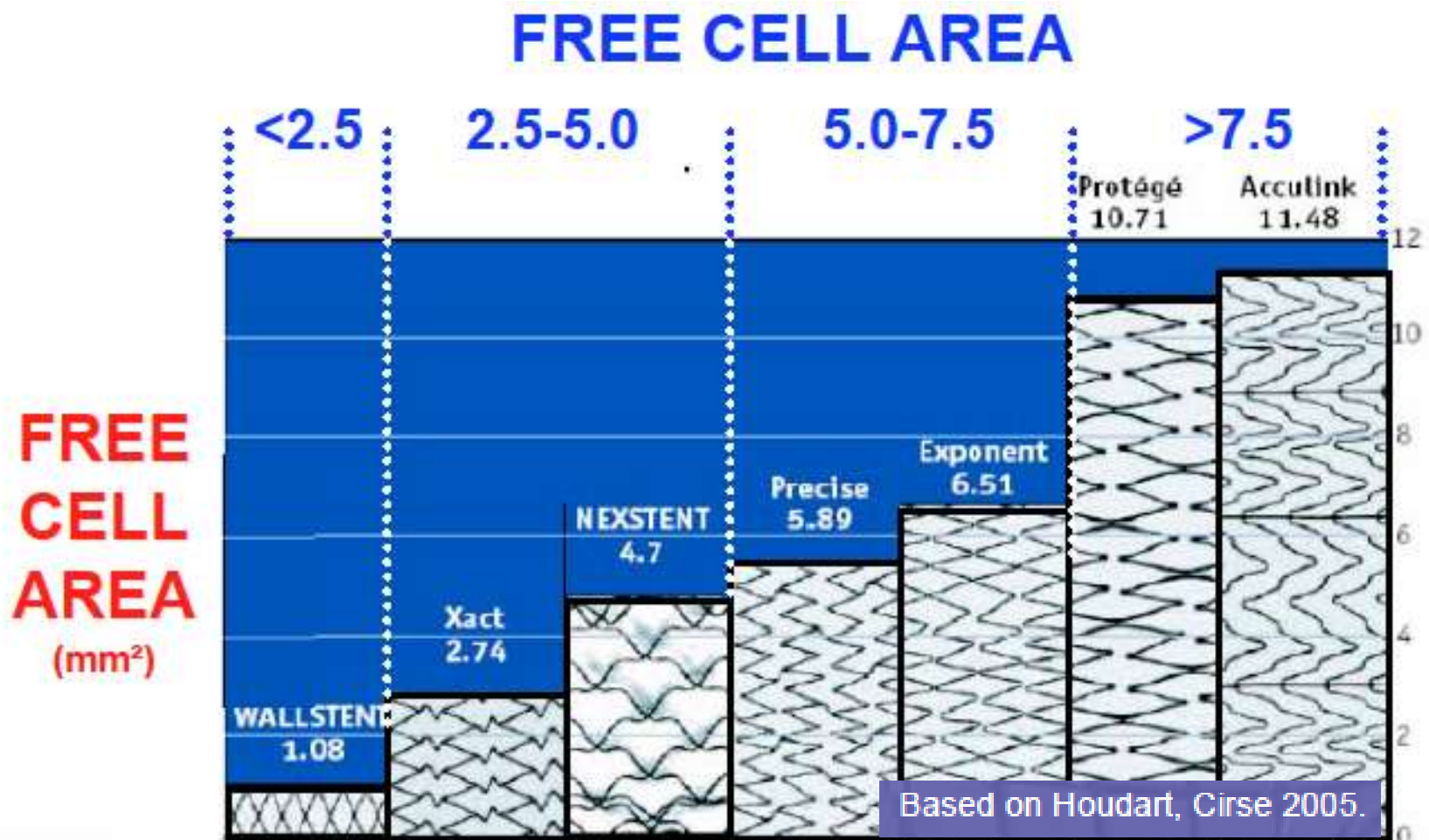
Carotid Artery Stenting

- Manipolazione Arco
- Posizionamento Sistema di Protezione Cerebrale
- Fenomeni Microembolici
- Stent



Carotid Artery Stenting

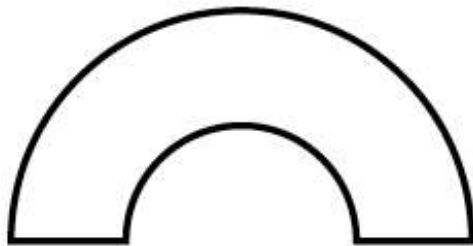
- Stent



Carotid Artery Stenting

- Stent

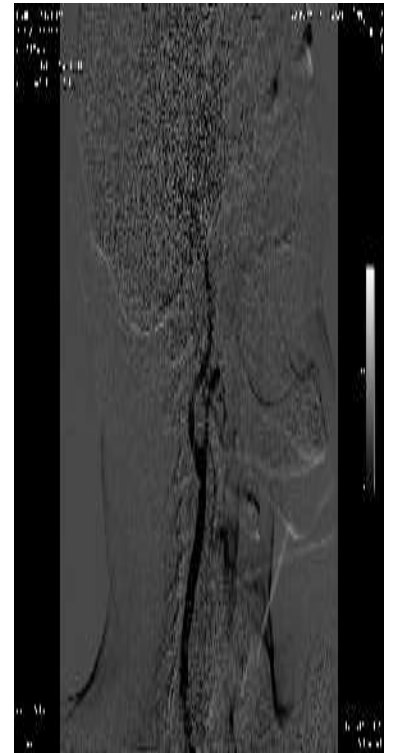
STENT BEHAVIOUR IN TORTUOUS CAROTIDS



Open cell stent



Closed cell stent



Carotid Artery Stenting

OPEN VERSUS CLOSED-CELL

Randomized clinical trial of open-cell vs closed-cell stents for carotid stenosis and effects of stent design on cerebral embolization

Carlos H. Timaran, MD,^{a,b} Eric B. Rosero, MD,^b J. Gregory Modrall, MD,^{a,b} and G. Patrick Clarridge, MD,^b Adriana Ilarraza, BS,^b

Society for Vascular Surgery Vascular Registry evaluation of stent design on carotid artery stenting outcomes

Jeffrey Jim, MD,^a Brian G. Rubin, MD,^a Gregg S. Landis, MD,^b Christopher T. Kenwood, MS,^c Flora S. Siami, MPH,^c and Gregorio A. Sicard, MD,^a and the SVS Outcomes Committee,* St. Louis, Mo; Flushing, NY; and Watertown, Mass

The Tailored Approach to CAS

- Valutazione preoperatoria Placca Carotidea (Gray Scale Median <25; aumento rischio di Ictus: ICAROS Study)
- Lunghezza Stenosi
- Dimensioni Carotide Interna e Comune
- Studio Anatomia dell'arco e dei TSA
- Anatomia della Biforcazione carotidea e dell'ACI



Cremonesi A et al, Endovasc today 2010

Antonello A et al, Does the type of carotid artery closure influence the management of recurrent carotid artery stenosis? Results of 6yrs prospective comparative study. Surg 2008

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AHA GUIDELINES

Class I

CAS is indicated as an alternative to CEA for symptomatic patients at average or low risk of complications associated with endovascular intervention when the diameter of the lumen of the internal carotid artery is reduced by more than 70% as documented by noninvasive imaging or more than 50% as documented by catheter angiography and the anticipated rate of periprocedural stroke or mortality is less than 6% .

(Level of Evidence: B)

Class IIa

It is reasonable to choose CAS over CEA when revascularization is indicated in patients with neck anatomy unfavorable for arterial surgery.

(Level of Evidence: B)

Class IIb

Prophylactic CAS might be considered in highly selected patients with asymptomatic carotid stenosis (minimum 60% by angiography, 70% by validated Doppler ultrasound), but its effectiveness compared with medical therapy alone in this situation is not well established .

(Level of Evidence: B)

AHA GUIDELINES

Class I

Before and for a minimum of 30 days after CAS, dual-antiplatelet therapy with aspirin (81 to 325 mg daily) plus clopidogrel (75 mg daily) is recommended. For patients intolerant of clopidogrel, ticlopidine (250 mg twice daily) may be substituted.

Level of Evidence: C

Administration of antihypertensive medication is recommended to control blood pressure before and after CAS.

Level of Evidence: C

Class IIa

EPD deployment during CAS can be beneficial to reduce the risk of stroke when the risk of vascular injury is low.

Level of Evidence: C

SVS GUIDELINES 1

- Use of an embolic protection device (proximal or distal occlusion, distal filter) is recommended during CAS to reduce the risk of cerebral embolization (GRADE 1, Level of Evidence B).
- CEA is preferred over CAS in patients aged 70 years of age, with long (15-mm) lesions, preocclusive stenosis, or lipid-rich plaques that can be completely removed safely by a cervical incision in patients who have a virgin, non radiated neck (GRADE 1, Level of Evidence A).

SVS GUIDELINES 2

- CAS is preferred over CEA in *symptomatic* patients with 50% stenosis and tracheal stoma, situations where local tissues are scarred and fibrotic from prior ipsilateral surgery or external beam radiotherapy, prior cranial nerve injury, and lesions that extend proximal to the clavicle or distal to the C2 vertebral body (GRADE 2, Level of Evidence B).
- CAS is preferred over CEA in *symptomatic* patients with 50% stenosis and severe uncorrectable CAD, heart failure, or chronic obstructive pulmonary disease (GRADE 2, Level of Evidence C).

SVS GUIDELINES 3

- Neurologically asymptomatic patients deemed “high risk” for CEA should be considered for primary medical management. CEA can be considered in these patients only with evidence that perioperative morbidity and mortality is 3% . CAS should not be performed in these patients except as part of an ongoing clinical trial (GRADE 1 , Level of Evidence B).

SVS GUIDELINES 4

- There are insufficient data to recommend CAS as primary therapy for neurologically asymptomatic patients with 70% to 99% diameter stenosis. Data from CREST suggest that in properly selected asymptomatic patients, CAS is equivalent to CEA in the hands of experienced interventionalists. Operators and institutions performing CAS must exhibit expertise sufficient to meet the previously established AHA guidelines for treatment of patients with asymptomatic carotid stenosis. Specifically, the combined stroke and death rate must be 3% to ensure benefit for the patient (GRADE 2, Level of Evidence B).

CONCLUSIONI

- C A S ha una indicazione precisa
- Selezione del paziente
- Poter offrire al paziente un trattamento “su misura”
- Centri ad alto volume: 50 C A S anno

Carotid Artery Stenting : First Consensus Document of the ICCS-SPREAD Joint Committee

Alberto Cremonesi, Carlo Setacci, Angelo Bignamini, Leonardo Bolognese, Francesco Briganti, Germano Di Sciascio, Domenico Inzitari, Gaetano Lanza, Luciano Lupattelli, Salvatore Mangiafico, Carlo Pratesi, Bernard Reimers, Stefano Ricci, Gianmarco de Donato, Ugo Ugolotti, Augusto Zaninelli and Gian Franco Gensini

Stroke **September 2006**



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EARLY RESULTS

Table . Independent Predictors of Adverse Outcome at 30 Days After CAS

Predictor	P Value
Increased age	.006
History of stroke	<.001
History of TIA presentation	.001
Recent (<4 weeks) MI	.006
Dialysis treatment	.007
Need for cardiac surgery as well as carotid revascularization	.005
Right-sided carotid stenosis	.006
Longer carotid plaque	.012
Type 2 or 3 aortic arch	.035
Tortuous carotid arterial system	.004

*From Medscape Education Clinical Briefs
Carotid Artery Stenting and Stroke Predictors in High-Risk Patients*